

## ABSTRACT OF THE DISCLOSURE

An apparatus and method for interrogating fiber optic sensors non-intrusively sensing fluid flow within a pipe is provided. The apparatus includes a two beam interferometer which comprises an optics circuit for generating a series of discrete light pulses that are directed at sensors positioned between pairs of low reflectivity fiber Bragg gratings. The successive light pulses are split into first light pulses and second light pulses and the second light pulses are delayed a known time period relative to the first pulses. The first and second light pulses are combined onto a single optical fiber and directed through the low reflectivity gratings and the sensor positioned between the gratings. Reflected pulses from the series of pulses impinge on a photo receiver and interrogator wherein the phase shift between the reflected first light pulses from the second grating and the reflected second light pulses from the first grating for each sensor are determined. Phase shifts from successive pulses for each sensor are compared and a change in a measured parameter of the fluid is determined.